

This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a **Major, Municipal** permit. The discharge results from the operation of a 2.2 MGD wastewater treatment plant. This permit action consists of updating the proposed effluent limits to reflect the current Virginia WQS (effective January 6, 2011) and updating permit language as appropriate. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9VAC25-260 et seq.

1. Facility Name and Mailing Address: Quantico Mainside STP  
P.O. Box 1057  
Quantico, VA 22134  
  
Facility Location: 658 Epperson Avenue  
Quantico, VA 22134  
  
Facility Contact Name: Stacey Rosenquist  
Facility E-mail Address: stacey.rosenquist@usmc.mil  
  
SIC Code : 4952 WWTP  
  
County: Prince William  
  
Telephone Number: 703-432-1335
2. Permit No.: VA0028363  
  
Other VPDES Permits associated with this facility: VA0002151; VA0028371; VAN010043  
Other Permits associated with this facility: Air (70267); RCRA (VA1170024722); Petroleum (Registration No. 3021353); Camp Barrett Small Arms Shop (Stafford 002); Camp Barrett Pump Station (Stafford 003)  
  
E2/E3/E4 Status: E3  
  
Expiration Date of previous permit: 09/18/2013
3. Owner Name: United States Marine Corps  
Owner Contact/Title: Colonel David W. Maxwell  
Commander, Marine Corps Base  
Quantico  
Owner E-mail Address: David.maxwell@usmc.mil  
  
Telephone Number: 703-784-5900
4. Application Complete Date: 05/09/2013  
Permit Drafted By: Anna Westernik  
Draft Permit Reviewed By: Alison Thompson  
WPM Review By: Bryant Thomas  
Public Comment Period : Start Date: 01/09/2014  
  
Date Drafted: 07/03/2013  
Date Reviewed: 07/16/2013  
Date Reviewed: 08/02/2013  
End Date: 02/07/2014
5. Receiving Waters Information: See **Attachment 1** for the Flow Frequency Determination  
  
Receiving Stream Name : Quantico Bight  
Drainage Area at Outfall: Unknown  
Stream Basin: Potomac River  
Section: 5  
Special Standards: b  
7Q10 Low Flow: Tidal  
1Q10 Low Flow: Tidal  
30Q10 Low Flow: Tidal  
Harmonic Mean Flow: Tidal  
  
Stream Code: 1aPOT  
River Mile: 80.59  
Subbasin: Potomac River  
Stream Class: II  
Waterbody ID: VAN-A26E  
7Q10 High Flow: Tidal  
1Q10 High Flow: Tidal  
30Q10 High Flow: Tidal  
30Q5 Flow: Tidal

## 6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

<input checked="" type="checkbox"/> State Water Control Law	<input type="checkbox"/> EPA Guidelines
<input checked="" type="checkbox"/> Clean Water Act	<input checked="" type="checkbox"/> Water Quality Standards (VA and MD)
<input checked="" type="checkbox"/> EPA NPDES Regulation	<input checked="" type="checkbox"/> 9VAC25-415-10 et seq. (Policy for the Potomac River Embayments)

## 7. Licensed Operator Requirements: Class I

## 8. Reliability Class: Class I

## 9. Permit Characterization:

<input type="checkbox"/> Private	<input checked="" type="checkbox"/> Effluent Limited	<input checked="" type="checkbox"/> Possible Interstate Effect
<input checked="" type="checkbox"/> Federal	<input checked="" type="checkbox"/> Water Quality Limited	<input type="checkbox"/> Compliance Schedule Required
<input type="checkbox"/> State	<input checked="" type="checkbox"/> Whole Effluent Toxicity Program Required	<input type="checkbox"/> Interim Limits in Permit
<input type="checkbox"/> POTW	<input type="checkbox"/> Pretreatment Program Required	<input type="checkbox"/> Interim Limits in Other Document
<input checked="" type="checkbox"/> TMDL		

10. **Wastewater Sources and Treatment Description:**

The Quantico Mainside STP is an advanced wastewater treatment facility designed to treat an average flow of 2.2 MGD. Primary, secondary, and tertiary treatment are provided at this facility.

Primary Treatment

Primary treatment consists of screening, grit removal, equalization, and primary clarification. Both mechanical and manual bar screens remove large debris and trash from the influent to protect the downstream equipment. After screening, the flow enters the grit removal system where grit and solids settle and collect in the center of two vortex grit chambers. The grit is pumped to grit cyclones and classifiers where it is dewatered and washed. It is discharged with the screenings and grit conveyor belt where it combines with the screening material before disposal.

Flow that has been screened and dewatered is directed to the four primary clarifiers except during high flow periods when a portion of the flow is directed to the sideline equalization tank, which is used to mitigate the peak loads and plant recycle flows. Each pair of clarifiers are arranged as two independent treatment units with a common wall. The clarifiers are equipped with a chain and flight collector mechanism that pushes the settled sludge into the hoppers and skims the scum and floating solids along the surface toward the scum trough. The chain and flight collectors transfer sludge from the floor of the clarifiers to the sludge hoppers. A portion of the sludge is removed to the sludge storage tank, including sludge returned to the headworks from the biological treatment units.

Secondary Treatment

A certificate to operate for a nitrogen removal upgrade was issued by the Virginia Department of Environmental Quality, Northern Regional Office (DEQ-NRO) on January 1, 2011. Secondary treatment consists of a four-stage Bardenpho biological nutrient removal system and secondary clarification. Sodium hydroxide is added in the secondary treatment phase for pH and alkalinity adjustment. The biological system is designed for enhanced nutrient removal and consists of:

- a. A denitrification tank that is split into four equally sized zones. One zone is anoxic and dedicated to denitrification and three zones are swing zones that can be operated with no air and mechanical mixing to provide denitrification or aerated by using diffusers and turning off the mechanical mixer.
- b. The nitrification tank is split into three zones. The first zone is aerobic for nitrification; the second zone provides denitrification (acetic acid is fed here as a carbon source), and the third zone provides aeration to remove any residual acetic acid and nitrogen gas prior to clarification. Flow from the nitrification stage is returned to the first denitrification stage.

Mixed liquor from the nitrification tanks is conveyed by gravity to the secondary clarifiers where biomass is settled and clarified effluent flows to tertiary treatment. Liquid polymer and/or alum may be added at this stage to enhance clarification and to aid coagulation and phosphorus removal, respectively.

#### Tertiary Treatment

Tertiary and final treatment consists of filtration, post aeration and ultraviolet (UV) disinfection. Secondary effluent is pumped to a holding tank above the filters from where it flows by gravity through the polishing filters to post aeration, UV disinfection, and the outfall. Filtration removes any suspended solids from the secondary clarifier effluent and improves the efficiency of downstream disinfection. The filtered water flows by gravity to the post aeration tanks. UV disinfection consists of three banks of horizontal UV lamps in series submerged in the open channel that carries effluent flow.

The outfall discharges into an artificial slow-flowing channelized area near Epperson Avenue. Flow travels through a culvert under the road into Quantico Bight.

See **Attachment 2** for a facility schematic/diagram.

TABLE 1 – Outfall Description				
Outfall Number	Discharge Sources	Treatment	Design Flow(s)	Outfall Latitude and Longitude
001	Domestic and/or Commercial Wastewater	See Item 10 above.	2.2 MGD	38° 30' 53.7" N 77° 17' 55.2" W
See <b>Attachment 3</b> for USGS Topographic Map 194D (Quantico Quadrangle).				

#### **11. Sludge Treatment and Disposal Methods:**

The sludge is sent to two anaerobic digesters for storage. These digesters are currently not operational; Quantico is in the process of converting them to aerobic digesters. Centrifuge dewatering is used to reduce the volume of sludge that is hauled offsite. The sludge is withdrawn from the storage tank and fed to the centrifuge. The centrate is discharged to the plant recycle pump station. Polymer is added to condition the sludge and increase the solids concentration in the dewatered cake. Disposal of sludge is at the King George County Landfill.

**12. Discharges, Intakes**

TABLE 2 - Discharges, Intakes, and Other Items in Waterbody VAN-A26E		
Individual VPDES Discharge Permits		
Description	Receiving Stream	Description
Dominion -- Possum Point Power Station VA0002071(Industrial Major)	Quantico Creek Quantico Creek, UT Potomac River (Maryland Waters)	7 Industrial Process Water Outfalls. 20 Storm Water Outfalls Industrial storm water, condenser cooling water, cooling tower blowdown, cooling tower drift, yard drains, floor drains, Unit 5 circulating water, Units 1-4 sand filter backwash, filter purge, Unit 6 wash water, electrodialysis reversal (EDR) backwash, neutralization sump, Ash Pond D discharge, Ash Pond E discharge, tank bottoms, Potomac River intake water, cooling water intake structures, non-contact cooling water, boiler wash water, air preheater rinse, precipitator rinse, oil unloading and handling system wastewater, tank bottoms, auxiliary boiler blowdown, false start drains, and storm water
USMC Quantico – NREAB Industrial VA0002151 (Industrial Major)	Potomac River Potomac River, UT Chopawamsic Creek Chopawamsic Creek, UT; Beaverdam Run, UT; Smith Lake, UT	17 Industrial Outfalls Water treatment plant, vehicle maintenance and washing activities, non-contact cooling water, steam condensate, and storm water associated with industrial activities (including the sewage treatment plant storm water).
Intakes		
Virginia Electric Power Intakes	Potomac River	Intakes for makeup water for steam electric power plant activities (primarily once-through non-contact cooling water).
Storm Water Industrial General Permits		
Permit Description		Receiving Stream
Whitehurst Transport Incorporated - Dumfries (VAR051065)		Quantico Creek
NuStar Terminals Operations Partnership LP-Asphalt (VAR051039)		Potomac River

**13. Material Storage:** See **Attachment 4**.**14. Site Inspection:** Performed by NRO water compliance staff on May 17, 2013 (see **Attachment 5**).**15. Receiving Stream Water Quality and Water Quality Standards:**a) Ambient Water Quality Data

This facility discharges to Quantico Bight. Quantico Bight is a portion of the Virginia Oligohaline Potomac (POTOH) segment delineated by the Chesapeake Bay Program (CBP). The nearest DEQ monitoring station, 1aPOT080.29, is located in Quantico Bight approximately 0.3 miles downstream of Outfall 001. Limited water quality data is available at this DEQ station. Long-term water quality data is available at a Maryland Department of Natural Resources (MD DNR) station. Station TF2.4 is located in the Potomac River, approximately 3 miles upstream of Outfall 001 (see **Attachment 6**).

The following is the water quality summary from DEQ Monitoring Station 1aPOT080.29 for Quantico Bight as taken from Virginia's 2012 Integrated Report approved on December 12, 2013:

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. Additionally, results from a Semi-Permeable Membrane Device (SPMD) deployment indicated that water concentrations for total PCBs exceeded the human health criterion of 0.00064 µg/L, noted by an observed effect. A PCB TMDL for the tidal Potomac River watershed has been completed and approved.

The aquatic life use is fully supporting. The status of the aquatic life use in Quantico Bight was determined from the assessment of dissolved oxygen and submerged aquatic vegetation in the Virginia POTOH segment. The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day dissolved oxygen mean is acceptable, however, the seven day dissolved oxygen mean and instantaneous levels have not been assessed. A TMDL has been completed for the Chesapeake Bay watershed.

The recreation and wildlife uses were not assessed.

Quantico Bight is the receiving stream for the discharge from this facility and is listed as fully supporting the aquatic life use. There is a downstream TMDL that has been completed by EPA to address poor water quality in the Chesapeake Bay. This TMDL covers the entire Bay watershed, including the upstream tidal tributaries such as Quantico Bight.

b) 303(d) Listed Stream Segments and Total Maximum Daily Loads (TMDLs)

TABLE 3 -- Impairment Information in the 2012 Integrated Report

Waterbody Name	Impaired Use	Cause	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Quantico Bight/Potomac River	Fish Consumption	PCBs	Tidal Potomac PCB; 10/31/2007	0.195 grams/year PCB	0.064 ng/L --- 2.2 MGD	NA

TABLE 4 -- Impairment Information in the Final MD 2012 Integrated Report

Waterbody Name	Impaired Use	Cause	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Potomac River (MD Oligohaline)	Open-Water Fish & Shellfish ---	Total Nitrogen	Chesapeake Bay 12/29/2010	20,101 lbs/yr TN	Edge of Stream (EOS) Loads	N/A
	Seasonal Migratory Fish Spawning and Nursery	Total Phosphorus		1,206 lbs/yr TP		
	Aquatic Life & Wildlife	Unknown	No	---	---	Low priority, not within 2 years

TABLE 5 -- Additional Information in the Chesapeake Bay TMDL

Waterbody Name	Impaired Use	Cause	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Chesapeake Bay	Aquatic Life	Total Suspended Solids	Chesapeake Bay TMDL 12/29/2010	201,006.96 lbs/yr TSS	Edge of Stream (EOS) Loads	N/A

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2010 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment. EPA issued the Bay TMDL on December 29, 2010. It was based, in part, on the Watershed Implementation Plans developed by the Bay watershed states and the District of Columbia.

The Chesapeake Bay TMDL addresses all segments of the Bay and its tidal tributaries that are on the impaired waters list. As with all TMDLs, a maximum aggregate watershed pollutant loading necessary to achieve the Chesapeake Bay's water quality standards has been identified. This aggregate watershed loading is divided among the Bay states and their major tributary basins, as well as by major source categories (wastewater, urban storm water, onsite/septic agriculture, and air deposition). Section 17.e of this fact sheet provides additional information on specific nutrient limitations for this facility to implement the provisions of the Chesapeake Bay TMDL.

The full planning statement is found in **Attachment 7**.

c) Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream, Quantico Bight, is located within Section 5 of the Potomac River Basin, and classified as a Class II water.

Class II tidal waters in the Chesapeake Bay and its tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC25-260-185 and maintain a pH of 6.0-9.0 standard units as specified in 9VAC25-260-50. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use. The applicable dissolved oxygen concentrations are presented **Attachment 8**.

Maryland Water Quality criteria state that pH values must be maintained between 6.5 and 8.5 S.U. and the dissolved oxygen criteria be no less than 5 mg/L at any time.

**Attachment 9** details other water quality criteria applicable to the receiving stream. Per Virginia Water Quality Standards at 9VAC25-260-50.4, the Quantico Mainside discharge is located in a transition zone

between estuarine and tidal freshwater. The transition zone includes all tidal tributaries that enter the Potomac River from Buoy 43 to 33 near Dahlgren, Virginia. Virginia freshwater criteria were calculated and Virginia saltwater criteria were calculated using a mean salinity as 0.39 g/kg.

The mixing zone model for the discharge area into Quantico Bight dated June 20, 2011 and amended on August 2, 2011 was used to determine the dilution ratios and hence, the water quality criteria and wasteload allocations in Quantico Bight (see **Attachment 10**).

#### Ammonia:

Ammonia criteria were assessed using a mixture of the pH and temperature data from the effluent (April 2012 through March 2013) and receiving stream data derived from Maryland Department of Natural Resources (DNR) monitoring station TF24 (January 2008 through December 2012), located approximately 3.0 miles upstream of Outfall 001 in the Potomac River. The 90<sup>th</sup> percentile pH value for the effluent and receiving stream were 7.6 S.U. and 8.1 S.U., respectively. The actual 90<sup>th</sup> percentile annual stream temperature of 28°C derived from the period of January 2008 through December 2012 and a default annual effluent temperature of 25°C was used to calculate ammonia criteria. The actual 90<sup>th</sup> percentile winter (November-March) stream temperature of 12°C and a historical default effluent temperature value of 15 °C derived from the period of January 2008 through December 2012 was used to calculate ammonia criteria. See **Attachment 11** for a summary of pH and temperature data.

9VAC25-260-50 of the Virginia Water Quality Standards states that in a transition zone, the more stringent of either the freshwater or saltwater criteria apply. See Table 6 below for a comparison of the Virginia saltwater and freshwater ammonia criteria and the Maryland freshwater criteria (Maryland saltwater criteria could not be used because the salinity values in the discharge area are too low). The Virginia saltwater criteria, shown in italicized bolded lettering in Table 6 below, shall be used in the determination of wasteload allocations and permit limits since they are the most stringent and are therefore, protective of both Virginia and Maryland waters.

TABLE 6 – Ammonia Criteria			
	VA Saltwater (mg/L)	VA Freshwater (mg/L)	MD Freshwater (mg/L)*
<b>Annual Acute</b>	<b><i>4.2</i></b>	11	17.0
<b>Winter Acute</b>	<b><i>11</i></b>	11	17.0
<b>Annual Chronic</b>	<b><i>0.38</i></b>	0.94	1.90
<b>Winter Chronic</b>	<b><i>1.2</i></b>	2.2	3.98

\* Per Title 26 of the Department of the Environment, Subtitle 08 Water Pollution, Chapter 02 Water Quality, .03-1 Toxic Substance Water Quality Criteria for Surface Waters. Maryland freshwater criteria were determined using the effluent pH of 7.6 (due to the domination of effluent in the receiving stream during slack tide periods), a winter temperature of 14°C, a summer temperature of 26° C, the assumption that early life stages are present, and salmonids are absent.

#### Metals Criteria:

A mixture of effluent and stream hardness data is used to determine the metals criteria for the Outfall 001 discharge based on an acute dilution ratio of 3:1 and a chronic dilution ratio of 23:1. The hardness-dependent metals water quality criteria in **Attachment 9** are based an average effluent hardness value of 36 mg/L derived from 2012 sampling (see **Attachment 12**) and a receiving stream hardness of 50 mg/L, based on a default value for hardness east of the Blue Ridge Mountains per DEQ guidance.

The criteria show in **Attachment 9** and Table 7 below are protective of the Maryland freshwater criteria since they are determined using the same methodology as Virginia freshwater criteria. Both the Virginia saltwater and freshwater criteria are the same. Maryland freshwater criteria were used to determine metals criteria because the salinity of the receiving stream is less than 5 ppt. Maryland saltwater and estuarine criteria do not apply at this low level of salinity.

TABLE 7 – Virginia Metals Criteria		
	VA Saltwater (µg/L)	VA Freshwater (µg/L)
<b>Copper Acute</b>	6.4	6.4
<b>Copper Chronic</b>	4.9	4.9
<b>Zinc Acute</b>	60	60
<b>Zinc Chronic</b>	65	65

**Bacteria Criteria:**

The Virginia Water Quality Standards at 9VAC25-260-170A state that the following criteria shall apply to protect primary recreational uses in surface waters:

Enterococci bacteria per 100 ml of water shall not exceed a monthly geometric mean of the following:

	Geometric Mean <sup>1</sup>
Saltwater and Transition Zone <sup>2</sup> enterococci	35

<sup>1</sup>For a minimum of four weekly samples taken during any calendar month.

<sup>2</sup>See 9VAC25-260-140 C for freshwater and transition zone delineation

The Maryland Water Quality Criteria Specific to Designated Uses (Code of Maryland Regulations 26.08.02.03-3.A) states that sewage discharges shall be disinfected to achieve the following criteria:

The single sample maximum allowable density for enterococci bacteria per 100 ml of water for all areas shall be as follows:

	Steady State Geometric Mean Indicator Density	Frequent Full Body Contact Recreation (Upper 75% CL <sup>1</sup> )
Freshwater enterococci	33	61
Marine water enterococci	35	104

<sup>1</sup>CL = confidence level

The Quantico Mainside STP discharges to a transition zone that is not considered marine water.

d) **Receiving Stream Special Standards**

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Quantico Bight, is located within Section 5 of the Potomac River Basin. This section has been designated with a special standard of b.

Special Standard “b” (Potomac Embayment Standards) established effluent standards for all sewage plants discharging into Potomac River embayments and for expansions of existing plants discharging into non-tidal tributaries of these embayments. 9VAC25-415, Policy for the Potomac Embayments controls point source discharges of conventional pollutants into the Virginia embayment waters of the Potomac River, and their tributaries, from the fall line at Chain Bridge in Arlington County to the Route 301 Bridge in King George County. The regulation sets effluent limits for BOD<sub>5</sub>, total suspended solids, phosphorus, and ammonia, to protect the water quality of these high profile waterbodies.



**16. Antidegradation (9VAC25-260-30):**

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

Staff has determined that the receiving waters, Quantico Bight, are Tier 1 due to the high instream waste concentration (IWC) of the receiving stream at the discharge point during critical flow periods. It is staff's opinion that streams comprised primarily of effluent are Tier 1. Additionally, the fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and the results from SPMD deployment indicate that water concentrations for total PCBs exceed the human health criterion of 0.00064 ug/L as noted by an observed effect. Downstream impairments due to nutrients and total suspended solids are also present.

For Tier 1 waters, antidegradation is addressed by ensuring that the effluent limits result in compliance with the water quality criteria.

**17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:**

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points are equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated. Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLA) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. In the case of ammonia evaluations, limits are needed if the 97th percentile of the thirty-day average effluent concentration values is greater than the chronic WLA. Effluent limitations are the calculated on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

**a) Effluent Screening and Wasteload Allocations**

Staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent discharged (e.g., total residual chlorine where chlorine is used as a means of disinfection) and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. With regard to the Outfall 001 discharge, ammonia as N is likely present being that this is a municipal wastewater treatment plant, total residual chlorine may be present since backwash water from a water treatment plant discharges into the collection system and potable water containing chlorine may be used to disinfect the sandfilters, and permit application monitoring data indicate that copper and zinc are present in the discharge (**Attachment 12** is a summary of permit application effluent data). Current DEQ guidance does not recommend calculating seasonal WLAs for any toxic pollutants except ammonia.

- 1) Acute WLAs: DEQ Guidance Memorandum 00-2011 recommends that for surface discharges into tidal areas the acute wasteload allocation (WLAa) should be set at two times the acute standard because initial mixing in these circumstances is limited and lethality in the allocated impact zone must be prevented. The 2x factor is based on the acute standard or Criteria Maximum Concentration (CMC) being one half of the Final Acute Value (FAV) for a specific toxic pollutant. This 2x factor may be applied when a site specific model is not available.

For the Quantico Mainside STP discharge, a 3:1 dilution ratio, based on the 2011 mixing zone study for Quantico Bight, will be applied in determining the acute WLAs. The 3:1 dilution ratio is based on the average of the dilution ratios at high slack tide (1.0), 0.5 hours after slack tide (3.0), and 1 hour after slack tide (6.0) using the centerline dilution ratio at a RMZ (regulatory mixing zone) distance of 250 meters (see Table 6 in **Attachment 10**).

- 2) Chronic WLAs and Human Health WLAs: DEQ Guidance Memorandum 00-2011 recommends that for surface discharges into tidal areas the chronic and human health wasteload allocations ( $WLA_c$  and  $WLA_h$ ) should be based upon site specific data on waste dispersion or dilution when available and appropriate. Where wastewater dispersion/dilution data are not available, a dilution ratio of 50:1 may be used.

A 23:1 dilution ratio was used to calculate  $WLA_c$  and  $WLA_h$  for the Quantico Mainside STP based on a steady state centerline dilution ratio at a RMZ distance of 250 meters shown in Table 6 of the 2011 mixing zone study for Quantico Bight (**Attachment 10**).

b) Effluent Limitations Toxic Pollutants, Outfall 001

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

- 1) Ammonia as N/TKN: The April-October limits are based on the Policy for the Potomac River Embayments (9VAC25-415-10 et seq.), which are more stringent than both the Virginia and Maryland water quality criteria. When April-October limits were calculated using Virginia saltwater criteria, it was determined that a monthly average limit of 6.0 mg/L and a weekly average of 7.3 mg/L are needed (see **Attachment 13**). The Policy for the Potomac River Embayments requires a limit of 1.0 mg/L for this time period and daily monitoring.

Winter ammonia limits (November-March) were removed when the permit was modified in March 2003. A mixing zone study for Quantico Bight conducted in 2011 (**Attachment 10**) shows a 3:1 and 23:1 dilution ratio for acute and chronic criteria, respectively. Limits were recalculated using Virginia saltwater quality criteria for November-March and weekly monitoring; there remains no need for ammonia limits during this time period (**Attachment 13**).

- 2) Total Residual Chlorine: Although this sewage treatment plant does not chlorinate the discharge, chlorine is present in the influent because the treatment plant receives backwash water from the water treatment plant and potable water containing chlorine may be used to clean the sandfilters at the sewage treatment plant. Staff calculated the  $WLA_a$  and  $WLA_c$  for TRC using dilution ratios of 3:1 and 23:1, respectively. In accordance with current DEQ guidance, staff derived TRC limits using a default data point of 0.2 mg/L and the calculated WLAs. Per DEQ guidance, numeric limits for total residual chlorine (TRC) must be imposed in the permit even where limits are less than the detection level of 0.1 mg/L. A monthly average of 0.028 mg/L and a weekly average limit of 0.035 mg/L are proposed for this discharge (see **Attachment 13**).
- 3) Metals/Organics: No limits are needed. See **Attachment 13** for WLAs and derivation of the limits.

- 4) Effluent Limitations Policy for the Potomac River Embayments: The Potomac Embayment Standards (PES) includes monthly average effluent limits that apply to all sewage treatment plants. The Policy for the Potomac River Embayments states in part that, “the above limitations shall not replace or exclude the discharge from meeting the requirements of the State’s Water Quality Standards (9VAC25-260-10 et seq.).” Section 27 of this fact sheet discusses this policy in detail.

TABLE 8 – POLICY FOR THE POTOMAC RIVER EMBAYMENT LIMITATIONS	
Parameter	Monthly Average (mg/L)
CBOD <sub>5</sub>	5
Total Suspended Solids	6
Total Phosphorus	0.18
NH <sub>3</sub> (Apr 1 – Oct 31)	1

- c) Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants  
No changes to dissolved oxygen (D.O.), carbonaceous biochemical oxygen demand-5 day (CBOD<sub>5</sub>), TSS, phosphorus, pH, and enterococci limitations are proposed (see Part 17.f of this fact sheet for an effluent limitations and monitoring summary).
- d) Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients  
VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries. Only concentration limits are now found in the individual VPDES permit when the facility installs nutrient removal technology. The basis for the concentration limits is 9VAC25-40-70 - *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed*, which requires new or expanding discharges with design flows of  $\geq 0.04$  MGD to treat for Total Nitrogen (TN) and Total Phosphorus (TP) to either BNR levels (TN = 8 mg/L; TP = 1.0 mg/L) or SOA levels (TN = 3.0 mg/L and TP = 0.3 mg/L).

This facility has also obtained coverage under 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN010043. TN Annual Loads and TP Annual Loads from this facility are found in 9VAC25-720 – *Water Quality Management Plan Regulation* that sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges (i.e., those with design flows of  $\geq 0.5$  MGD above the fall line and  $\geq 0.1$  MGD below the fall line).

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, and Total Nitrogen is included in this permit. The monitoring is needed to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies for the aforementioned parameters are set at the frequencies set forth in 9VAC25-820. Annual average

effluent limitations and monthly and year-to-date calculations for TN are included in this individual permit. The annual average TN limit is based upon 9VAC25-40-70.

No TP annual average limits are included in this permit reissuance since the facility has monthly average and weekly average concentration limits in place for local water quality. The September 1, 1995 plans and specifications approval by the Virginia Department of Health references a phosphorus effluent limit of 0.18 mg/L. Additionally, the Policy for the Potomac River Embayments (PPRE) suggests water quality modeling may be required if staff believed the PPRE limits may not be sufficient to protect the receiving waters.

e) Effluent Limitations and Monitoring Summary.

The effluent limits are presented in the table that follows. Limits were established for pH, cBOD<sub>5</sub>, TSS, enterococci, D.O., TP, TN, ammonia, and TRC.

- 1) CBOD<sub>5</sub>, TSS, TP, and ammonia limits are based on the Policy for Potomac River Embayments (9VAC25-415-10 et seq.) and an approved TMDL (see Section 15.b of this fact sheet).
- 2) The limits for pH and enterococci are based on the Maryland Water Quality Criteria (Title 26, Subtitle 08 of the Code of Maryland Regulations).
- 3) The limits for TRC are based on Virginia Water Quality Standards (9VAC25-260-170) and the Maryland Water Quality Criteria (Title 26, Subtitle 08 of the Code of Maryland Regulations).
- 4) The limits for DO are based on best professional judgment supported by the demonstrated capability of the treatment plant and an approved TMDL (see Section 15.b of this fact sheet). For other major plants regulated by the Policy for the Potomac River Embayments, this value came from the 1988 modeling by the Northern Virginia Planning District Commission (NVPDC). Although the Quantico Mainside STP was not included within these studies, it is not expected that the 2.2 MGD flow will deplete the DO concentration within the 399-MGD Potomac River.
- 5) The limits for total nitrogen are based on the *Water Quality Management Plan Regulation* (9VAC25-40-70) and an approved TMDL (see Section 15.b of this fact sheet).

The mass loading (kg/d) for monthly and weekly averages for CBOD<sub>5</sub>, ammonia, and TSS were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 3.785.

The mass loading (lb/d) for TP monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 8.345.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for CBOD and TSS (or 65% for equivalent to secondary). The limits in this permit are water-quality-based effluent limits and result in greater than 85% removal.

**18. Antibacksliding:**

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

**19. Effluent Limitations/Monitoring Requirements:**

Design flow is 2.2 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS						MONITORING REQUIREMENTS	
		Monthly Average		Weekly Average		Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL		NA		NA	NL	Continuous	TIRE
pH	1	NA		NA		6.5 S.U.	8.5 S.U.	1/D	Grab
CBOD <sub>5</sub>	2	5 mg/L	42 kg/day	8 mg/L	67 kg/day	1/D	NA	1/D	24H-C
Total Suspended Solids (TSS)	2	6.0 mg/L	50 kg/day	9.0 mg/L	75 kg/day	1/D	NA	1/D	24H-C
Dissolved Oxygen (DO)	3,4,5	NA		NA		6.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	3,5,6	NL		NL		NA	NA	1/W	24H-C
Ammonia, as N (Apr-Oct)	2	1.0 mg/L	8.3 kg/d	1.5 mg/L	12 kg/d	NA	NA	1/D	24H-C
Enterococci (Geometric Mean) <sup>a</sup>	1	33 n/100 mls		NA		NA	NA	1/D	Grab
Total Residual Chlorine	3	0.028 mg/L		0.035 mg/L		NA	NA	1/D	Grab
Nitrate+Nitrite, as N	5,6	NL mg/L		NA		NA	NA	1/W	24H-C
Total Nitrogen <sup>b, c</sup>	3,5, 6	NL mg/L		NA		NA	NA	1/W	Calculated
Total Nitrogen – Year to Date <sup>c</sup>	3,5,6	NL mg/L		NA		NA	NA	1/M	Calculated
Total Nitrogen - Calendar Year <sup>c</sup>	3,5, 6	3.0 mg/L		NA		NA	NA	1/Y	Calculated
Total Phosphorus	2,5	0.18 mg/L	3.3 lb/d L	0.27 mg/L	5.0 lb/d	NA	NA	1/D	24H-C
Chronic Toxicity – <i>C. dubia</i> (TU <sub>c</sub> )	NA	NA		NA		NA	NL	1/Y	24H-C
Chronic Toxicity – <i>P. promelas</i> (TU <sub>c</sub> )	NA	NA		NA		NA	NL	1/Y	24H-C

The basis for the limitations codes are:

- |  |  |                         |
|--|--|-------------------------|
| 1. MD Water Quality Criteria   | MGD = Million gallons per day.                         | 1/D = Once every day.   |
| 2. Policy for the Potomac River Embayments<br>(9 VAC 25-425-10 et. seq.) | NA = Not applicable.                                   | 1/W = Once every week.  |
| 3. VA Water Quality Standards  | NL = No limit; monitor and report.                     | 1/M = Once every month. |
| 4. Best Professional Judgment  | TIRE = Totalizing, indicating and recording equipment. | 1/Y = Once every year.  |
| 5. Approved TMDL (See Section 15.b of Fact Sheet)                        | S.U. = Standard units                                  |                         |
| 6. 9VAC25-40-70 (Water Quality Mgmt. Plan)                               |  |                         |

**24H-C** = A flow proportional composite sample collected manually or automatically and discretely or continuously for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected. Where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

**Grab** = An individual sample collected over a period of time not to exceed 15-minutes.

<sup>(a)</sup> Samples shall be collected between the hours of 10:00 a.m. and 4:00 p.m.

<sup>(b)</sup> Total Nitrogen = Sum of TKN plus Nitrate+Nitrite.

<sup>(c)</sup> See Section 20.a. for the calculation of the Nutrient Calculations.

**20. Other Permit Requirements:**

- a) Permit Section Part I.B. contains additional chlorine monitoring requirements, quantification levels, and compliance reporting instructions.

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

- b) Permit Section Part I.C. details the requirements for Whole Effluent Toxicity (WET) Program.

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.I requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A WET Program is imposed for municipal facilities with a design rate >1.0 MGD; an approved pretreatment program or required to develop a pretreatment program; or those determined by the Board to require a program based upon effluent variability, compliance history, instream waste concentration (IWC), and receiving stream characteristics.

The Quantico Mainside STP is required to conduct WET testing because it is a major municipal discharger with the potential to cause toxicity in the receiving stream. During the previous permit cycle, the permittee conducted five annual chronic tests using both *Ceriodaphnia dubia* and *Pimephales promelas*. Four annual WET testing events conducted from August 2009 to February 2013 using Quantico Mainside STP effluent indicated an LC<sub>50</sub> greater than 100% effluent and a NOEC less than the IWC. Since the testing has passed all decision criteria, the permittee will be required to continue monitoring chronic toxicity annually during the term of the permit using *Ceriodaphnia dubia* and *Pimephales promelas*. If the effluent is found to be toxic, a toxicity reduction evaluation (TRE) will be required and a WET limit will be imposed unless the TRE has successfully identified the chemical(s) causing the toxicity. In that case, a chemical specific limit will be used in lieu of the WET limit. Sampling and reporting procedures are outlined in Part I.C of the permit.

The discharge area for Outfall 001 has tidal influence. As stated previously in this fact sheet, a 23:1 dilution is used in this permit to determine the WLAc for toxic parameters. It will be maintained here for consistency and will be used as the NOEC criteria for toxicity monitoring.

- c) Permit Section Part I.D.2, details the requirements for the regulation of users.

The VPDES Permit Regulation at 9VAC25-31-280.B.9 requires that the Board provide an explanation on the regulation of users (i.e., industrial, indirect dischargers) to treatment works not owned by a state or a municipality.

When the Quantico Mainside STP permit was reissued on September 19, 2008, the facility was required to submit an Industrial User Survey to DEQ-NRO within one year of the date of permit reissuance. A survey was received by DEQ-NRO on September 10, 2009.

To determine if there have been industrial user changes that may affect the discharge or have the potential to cause interference to the treatment works, Quantico Mainside STP will be required to submit an updated Industrial User Survey to DEQ-NRO within one year of the date of this permit reissuance.

**21. Other Special Conditions:**

- a) 95% Capacity Reopener. The VPDES Permit Regulation at 9VAC25-31-200.B.4 requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period.
- b) Indirect Dischargers. Per the VPDES Permit Regulation at 9VAC25-31-280.B.9, this sewage treatment plant shall submit an Industrial User Survey. This report will be due one year from the effective date of the permit.
- c) O&M Manual Requirement. Required by §62.1-44.19 of the Code of Virginia, the Sewage Collection and Treatment (SCAT) Regulations at 9VAC25-790, and the VPDES Permit Regulation at 9VAC25-31-190.E. The permittee shall maintain a current Operations and Maintenance (O&M) Manual. The permittee shall operate the treatment works in accordance with the O&M Manual and shall make the O&M Manual available to Department personnel for review upon request. Any changes in the practices and procedures followed by the permittee shall be documented in the O&M Manual within 90 days of the effective date of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.
- d) CTC, CTO Requirement. § 62.1-44.19 of the Code of Virginia and the SCAT Regulations at 9VAC25-790 require that all municipal wastewater treatment works obtain a Certificate to Construct (CTC) prior to commencing construction and a Certificate to Operate (CTO) prior to commencing operation of the municipal treatment works.
- e) Licensed Operator Requirement. §54.1-2300 et seq. of the Code of Virginia, the VPDES Permit Regulation at 9VAC25-31-200 C, and the Rules and Regulations for Waterworks and Wastewater Works Operators at 18VAC160-20-10 et seq. requires licensure of operators. This facility requires a Class I operator.
- f) Reliability Class. The SCAT Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. This facility is required to meet a reliability Class of I.
- g) Sludge Reopener. The VPDES Permit Regulation at 9VAC25-31-220.C. requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the Federal Clean Water Act. The facility includes a sewage treatment works treating domestic sewage.
- h) Sludge Use and Disposal. The VPDES Permit Regulation at 9VAC25-31-100.P; 9VAC25-31-220.B.2, and 9VAC25-31-420 -- 720 and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information regarding their sludge use and disposal practices and to meet specified standards for sludge use and disposal. The facility includes a treatment works treating domestic sewage.
- i) E3/E4. 9VAC25-40-70.B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.
- j) Nutrient Reopener. 9VAC25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction,

expansion or upgrade. 9VAC25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

- k) PCB Monitoring. This special condition requires the permittee to conduct PCB dry weather and wet weather monitoring using ultra-low level PCB analysis to support the implementation of the PCB TMDL for the tidal Potomac River.
  - l) PCB Pollutant Minimization Plan. This special condition requires the permittee, upon notification from DEQ-NRO, to submit a Pollutant Minimization Plan (PMP) to identify known and unknown sources of low-level PCBs in the effluent. This special condition details the contents of the PMP and also requires an annual report on progress to identify sources
  - m) Mixing Zone Study. A 6-inch deep CERLA Habitat Enhanced Cap is being installed for the 10.9 acre Quantico Embayment remediation area. The sand cap construction is expected to be completed in the Fall of 2013. The re-establishment of vegetation is expected to be completed Spring of 2014. The permittee may conduct an updated site specific mixing zone study for the receiving waters to determine wasteload allocations for toxic pollutants once the cap installation is completion and may request that the permit be modified to reflect the results of the study.
  - n) TMDL Reopener: This special condition is to allow the permit to reopened if necessary to bring it in compliance with any applicable TMDL that may be developed and approved for the receiving stream.
22. Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.
23. **Changes to the Permit from the Previously Issued Permit:**
- a) Special Conditions:
    - 1) The Alteration of the Outfall Special Condition has been removed.
    - 2) The O&M Manual Requirement Special Condition has been changed by removing the requirement for the submittal to DEQ of a revised O&M Manual or a statement confirming the accuracy of the current O&M Manual.
    - 3) A PCB Pollutant Minimization Plan Special Condition has been added.
    - 4) A Mixing Zone Study Special Condition has been added.
    - 5) A TMDL Reopener Special Condition has been added.
  - b) Monitoring and Effluent Limitations:
    - 1) Criteria and wasteload allocations are based on saltwater criteria and a mean salinity of 0.39 g/kg instead of freshwater criteria as was done in the previous permit reissuance as the saltwater criteria were found to be more stringent.
    - 2) The mixing zone ratios have been changed from a 10:1 to a 3:1 ratio for acute WLAs and a 50:1 to a 23:1 ratio for chronic WLAs and human health WLAs. This is based upon the modeling conducted in support of the projected installation of a CERLA Habitat Enhanced Cap.
    - 3) The loading values for ammonia were incorrect in the last permit reissuance. They have been changed to a monthly average of 8.3 kg/day and a weekly average of 12 kg/day.
    - 4) The total residual chlorine limits have been changed from a monthly average and weekly average of 0.094 mg/L and 0.113 mg/L to 0.028 mg/L and 0.035 mg/L.
  - c) Other:
    - 1) The EPA Checklist has been removed as an attachment.
    - 2) Part II of the permit has been updated to include VELAP language.



**24. Variances/Alternate Limits or Conditions:**

Tidal dilutions are based on a mixing zone study conducted in 2011 instead of DEQ Guidance Memorandum 00-2011. See Section 17.A of this fact sheet.

**25. Public Notice Information:**

First Public Notice Date: 01/08/2014

Second Public Notice Date: 01/15/2014

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3837, [anna.westernik@deq.virginia.gov](mailto:anna.westernik@deq.virginia.gov). See **Attachment 14** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

**26. Additional Comments:**a) Development of the Policy for the Potomac River Embayments (9VAC25-415-10):

The State Water Control Board adopted the Potomac Embayment Standards (PES) in 1971 to address serious nutrient enrichment problems evident in the Virginia embayments and Potomac River at the time. These standards applied to sewage treatment plants discharging into Potomac River embayments in Virginia and for expansions of existing plants discharging into the non-tidal tributaries of these embayments. The standards were actually effluent limitations for BOD, unoxidized nitrogen, total phosphorus, and total nitrogen:

<u>Parameter</u>	<u>PES Standard (monthly average)</u>
BOD <sub>5</sub>	3 mg/L
Unoxidized Nitrogen	1 mg/L (Apr – Oct)
Total Phosphorus	0.2 mg/L
Total Nitrogen	1 mg/L (when technology is available)

Based upon these standards, several hundred million dollars were spent during the 1970s and 1980s upgrading major treatment plants in the City of Alexandria and the Counties of Arlington, Fairfax, Prince William, and Stafford. Today, these localities operate advanced wastewater treatment plants that have contributed a great deal to the dramatic improvement in the water quality of the upper Potomac estuary. However, of all the PES limits, the facilities could only reliably meet the phosphorus effluent limitation.

Before the planned upgrades at these facilities were completed and the water quality improved, questions arose over the high capital and operating costs that would result from meeting all of the requirements contained in the PES. Questions also arose regarding the fact that the PES were blanket effluent limitations that applied equally to different bodies of water. Therefore, in 1978, the State Water Control Board committed to reevaluate the PES. In 1984, a major milestone was reached when the Virginia Institute of Marine Science (VIMS) completed state-of-the-art models for each of the embayments. The Board then selected the Northern Virginia Planning

District Commission (NVPDC) to conduct wasteload allocation studies of the Virginia embayments using the VIMS models. In 1988, these studies were completed and effluent limits that would protect the embayments and the mainstem of the Potomac River were developed for each major facility. Neither the Quantico Bight nor the Mainside STP was included in the NVPDC study. See **Attachment 15** for the executive summaries.

Since the PES had not been amended or repealed, VPDES permits had included the PES as effluent limits. Since the plants could not meet all of the requirements of the PES, the plant owners operated under consent orders or consent decrees with operating effluent limits for the treatment plants that were agreed upon by the owners and the Board.

In 1982, staff evaluated the applicability of the PES to the Quantico Bight and determined that the PES were not applicable to the Bight or Quantico Mainside STP. The Board ratified Letter Ballot 4948 at its September 1982 meeting, directing the staff to remove the PES from Quantico Bight. This is a possible reason why the Quantico Bight and the Mainside STP were not included in the VIMS models and NVPDC studies.

It was discovered in 1986, during the VPDES permit preparation for the Mainside STP, that although the Board had previously directed the staff to remove the PES designation from the Quantico Bight, the Water Quality Standards were never modified to removed the PES from the Quantico Bight. Consequently, the Mainside STP permit was reissued, containing PES standards as effluent limits. A Special Order was also issued to the U.S. Marine Corps for the Mainside STP on June 18, 1986, stating that the Board recognized that the effluent limits contained in Appendix A of the Order are interim limits, and that once the Board removed the PES from Quantico Bight, the Mainside STP permit would be amended to include new final effluent limitations. (A copy of this Special Order is included in **Attachment 15**). The public participatory process to receive data, views and arguments concerning the proposal to amend the Water Quality Standards to establish the Quantico Bight and its tidal tributaries as a separate section, Section 5C, in the Potomac River Subbasin, establishing the requirements of Class II waters with no special standards for Quantico Bight and its tidal tributaries was restarted, and a public hearing was held August 11, 1986, in the Prince William County Complex (Woodbridge, VA) (**Attachment 16**). However, no final Board action completed this amendment, and the Bight again remained subject to the PES.

In 1991 and 1992, several Northern Virginia jurisdictions with embayment treatment plants submitted a petition to the Board requesting that the Board address the results of the VIMS/NVPDC studies. Their petition requested revised effluent limitations and a defined modeling process for determining effluent limitations.

The recommendations in the petition were designed to protect the extra sensitive nature of the embayments along with the Potomac River, which has become a popular recreational resource during recent years. The petition included requirements more stringent than would be applied using the results of the modeling/allocation work conducted in the 1980s. With the inherent uncertainty of modeling, the petitioners questioned whether the results of modeling would provide sufficient protection for the embayments. By this petition, the local governments asked for continued special protection for the embayments based upon a management approach that uses stringent effluent limits. They believe this approach has proven successful over the past two decades. In addition, the petition included a modeling process that will be used to determine if more stringent limits are needed in the future due to increased wastewater discharges.

The State Water Control Board adopted the petition, with revisions, as a regulation on September 12, 1996 (**Attachment 17**). The regulation is entitled *Policy for the Potomac River Embayments* (9VAC25-415-10 et seq.). On the same date, the Board repealed the old PES. The new regulation became effective on April 3, 1997, and contains the following effluent limits, which became effective on April 3, 2002:

<u>Parameter</u>	<u>PES Standard (monthly average)</u>
BOD <sub>5</sub>	5 mg/L
TSS	6 mg/L
Total Phosphorus	0.18 mg/L
Ammonia as Nitrogen	1 mg/L (Apr - Oct)

9 VAC 25-415-50 Water Quality Monitoring. The Policy says “that water quality models may be required to predict the effects of wastewater discharges on the water quality of the receiving waterbody, the embayment, and the Potomac River. The purpose of the modeling shall be to determine if more stringent limits than those required by 9 VAC 25-415-40 (the Policy’s effluent limitations) are required to meet water quality standards.”

b) Previous Board Actions:

Quantico Mainside STP was referred to enforcement on June 17, 2002 for chronic overflows of untreated sewage from the wastewater treatment plant’s collection system. A Consent Order was executed on July 1, 2003 that required Quantico Mainside STP to implement interim measures to prevent the chronic overflows from the collection system until the lines were replaced or renovated. This Consent Order was closed in February 2006 because Quantico Mainside STP complied with all the terms of the Consent Order.

Quantico Mainside STP was referred to enforcement again on April 19, 2004 for failure to meet Reliability Class I requirements. A Plan of Action and Milestones was finalized on March 25, 2005 to address Class I Reliability and other regulatory deficiencies at the wastewater treatment plant. Items in the Plan of Action and Milestones were adequately address and DEQ-NRO enforcement staff dereferred the case on March 10, 2006.

c) Storm Water Management:

The industrial storm water from the sewage treatment plant site is permitted as Outfall 010 in the USMC Quantico – NREAB Industrial VPDES Permit (VA0002151).

d) Public Comment: No comments were received during the public notice.

e) Delay in Permit Reissuance: Reissuance of this permit was delayed after the completion of DEQ internal review due to significant comments from USMC Quantico that were reviewed and addressed.

**Attachments**

1. Flow Frequency Determination
2. Facility Schematic/Diagram
3. USGS Topographic Map 194D (Quantico Quad)
4. Summary of Material Storage
5. Summary from DEQ Inspection Conducted on May 17, 2013
6. Map Showing MD DNR Monitoring Station and Outfall 001
7. Planning Statement Dated June 5, 2013
8. Dissolved Oxygen Water Quality Criteria
9. Virginia Water Quality Criteria and Wasteload Allocations
10. Mixing Zone Model for Quantico Bight dated June 20, 2011 and amended on August 2, 2011
11. A Summary of pH and Temperature data derived from Quantico Mainside STP Effluent and Maryland DNR Monitoring Station TF24
12. 2012 Monitoring Data Submitted with the 2013 VPDES Permit Application for the USMC Quantico Mainside STP
13. Ammonia, TRC, and Metals Limit Calculations
14. Public Notice
15. Executive Summaries of Wasteload Allocation Studies
16. Special Consent Order Issued to USMC Quantico for the Mainside STP (1986)
17. Policy for the Potomac River Embayment (9VAC25-415-10 et seq.)